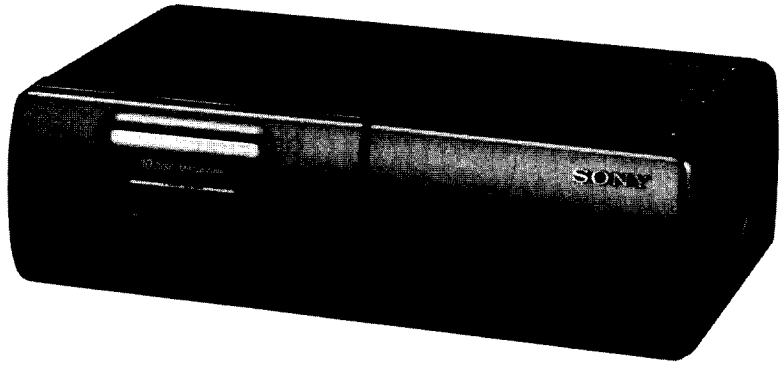
CDX-U500

SERVICE MANUAL

US Model
Canadian Model
AEP Model
UK Model
E Model



Model Name Using Similar Mechanism	NEW
Tape Transport Mechanism Type	KSM-310AAM

SPECIFICATIONS

System — Compact disc digital audio system

Laser diode properties
- Material: GaAlAs
- Wavelength: 780 nm
- Emission duration: Continuous
- Laser output power: Less than 44.6 μW*

* This output is the value measured at a distance of 200 mm from the objective lens surface on the Optical Pick-up Block.

System	Compact disc digital audio system
Frequency response	5 – 20,000 Hz ±1 dB
Wow and flutter	Below measurable limit
Signal-to-noise ratio	95 dB
Outputs	UNILINK control output (8 PIN) Analogue audio output (RCA PIN)
Current drain	800 mA (CD playback) 800 mA (during loading or ejecting a disc)
Operating temperature	– 10°C to 55°C
Dimensions	Approx. 305 × 88 × 177 mm (w/h/d) not incl. projecting parts and controls
Weight	Approx. 2.7 kg
Power requirement	12 V DC car battery (negative ground)
Supplied accessories	Disc magazine (1) Mounting hardware (1 set) UNILINK cable (1) RCA PIN cord (1)

Design and specifications subject to change without notice.

MICROFILM

COMPACT DISC PLAYER

SONY®

Features

- Sony UNILINK system compatible **mobile CD changer.**
- A selection of tracks from 10 discs stored in the disc magazine can be made and automatically played in the order of your preference.
- **Compact and space-saving design** for vertical, horizontal or suspended installation.
- 8 fs digital filter for high quality sound.
- 1 bit D/A converter.

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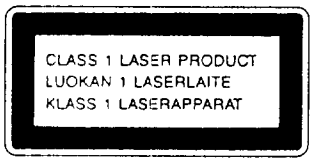
NOTES ON HANDLING THE OPTICAL PICK-UP BLOCK OR BASE UNIT

The laser diode in the optical pick-up block may suffer electrostatic breakdown because of the potential difference generated by the charged electrostatic load, etc. on clothing and the human body.
During repair, pay attention to electrostatic breakdown and also use the procedure in the printed matter which is included in the repair parts.
The flexible board is easily damaged and should be handled with care.



This Compact Disc player is classified as a CLASS 1 LASER product.
The CLASS 1 LASER PRODUCT label is located on the rear exterior.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

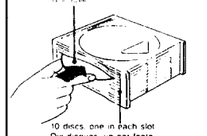
LES COMPOSANTS IDENTIFIÉS PAR UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

This section is extracted from instruction manual.

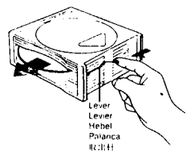
SECTION 1
GENERAL

Preparations
Préparatifs
Vorbereitungen
Preparativos
准备

1


Labeled surface
Surface étiquetée
Beschriftete Seite
Superficie con la etiqueta
10 discs, one in each slot
Dix disques, un par fente
Insgesamt 10 Platten (eine in jedem Fach)
10 discos, 1 en cada ranura

To remove
Retrait
Herausnehmen der Platte
Extracción



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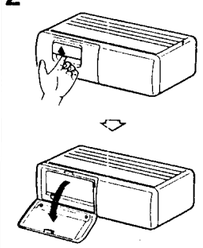

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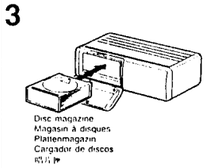
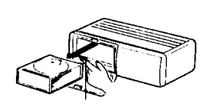


To remove
Retrait
Herausnehmen des Magazins
Extracción



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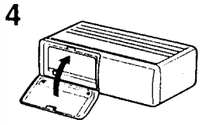


Use the unit with the door closed
Otherwise, foreign matter may enter the unit, and contaminate the lens in the player.

Notes
- To play a 3-inch CD, use the Sony CSA-8 adaptor (not supplied). Playing a 3-inch CD without the adaptor may damage the unit.
- When a disc magazine is inserted to the CDX-U500 or the reset button of the connected head unit is pressed, the unit will be automatically activated and read the information of the CDs. When the information of all the CDs in the disc magazine has been read, the unit will automatically stop the operation.

Utiliser cet appareil avec la porte fermée
Si cela n'est pas fait, des matières étrangères peuvent entrer dans l'appareil et contaminer la lentille du lecteur.

Remarques
- Pour la lecture de disque compact de 8 cm, utiliser l'adaptateur Sony CSA-8 (non fourni). Sans lui, l'appareil risque d'être endommagé.
- Lorsqu'un magasin à disques est inséré dans le CDX-U500 ou la touche de réinitialisation de la tête raccordée est actionnée, l'appareil se met automatiquement en marche et reproduit les informations des CD. Lorsque tous les CD ont été reproduits, l'appareil s'arrête automatiquement.

Das Gerät nur mit geschlossener Tür betreiben
Halten Sie die Tür des Geräles stets geschlossen, damit keine Fremdkörper in das Geräteinnere gelangen und die Linse im Spieler verschmutzen können.

Hinweise
- Verwenden Sie zur Wiedergabe einer 8-cm-CD den Sony Adapter CSA-8 (Sonderzubehör). Wiedergabe einer 8-cm-CD ohne Adapter kann zur Beschädigung des Gerätes führen.
- Beim Einsetzen des Plattenmagazins in den CDX-U500 und beim Drücken der Rückstelltaste an der angeschlossenen Haupteinheit tritt der Wechsler automatisch in Aktion und liest die Informationen von den CDs aus. Danach stoppt er automatisch wieder.

Emplee la unidad con la puerta cerrada
De lo contrario, podrían introducirse materias extrañas y contaminar el objetivo del reproductor.

Notas
- Para reproducir un disco compacto de 8 cm, utilice el adaptador CSA-8 Sony (no suministrado). La reproducción de un disco compacto de 8 cm sin el adaptador puede dañar la unidad.
- Cuando inserte un disco en el CDX-U500 o presione el botón de reposición de la unidad principal conectada, el reproductor se activará automáticamente y leerá la información de los discos compactos. Cuando se haya leído toda la información de los discos compactos del cargador, la unidad dejará automáticamente de funcionar.

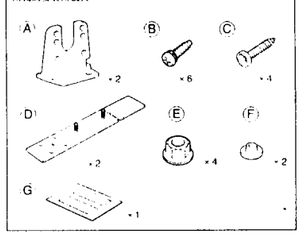
使用时请关上唱片匣盖门

否则异物会入于机内，或使唱机的透镜染上灰尘。

注
- 播放8cm唱片时，请另使用一个Sony CSA-8 型大孔唱片固定器。播放8cm唱片时若不使用该唱片固定器，会致使唱机损坏。
- CDX-U500型若装有唱片匣，或和CDX-U500相连着的主机的取消键被按下的话，本机便自动开始读取唱片的指令信号。当所有唱片匣中的唱片之指令信号都读取完毕，本机自动停止运转操作。

Installation
Installation
Installation
Instalacion
安装

Supplied Mounting Hardware
Materiel de montage fourni
Mitgelieferte Befestigungsteile
Ferreteria de monttaje suministrada
附属的安装用道具



Precautions

- Choose the mounting location carefully, observing the followings:
  - The fuel tank should not be damaged by the tapping screws.
  - There should be no wire harnesses nor pipelines under the place where you are going to install the unit.
  - The spare tire, tools or other equipment in or under the trunk should not be interlered with nor damaged by the screws or the unit itself.
- Be sure to use only the supplied mounting hardware for a safe and secure installation.

Précautions

- Choisir soigneusement l'endroit de montage en observant ce qui suit:
  - Le réservoir d'essence ne doit pas être endommagé par les vis taraudeuses.
  - Il ne doit pas y avoir de faisceau de fils ou de tuyaux à l'endroit ou l'on désire installer l'appareil.
  - La roue de secours, les outils ou autre équipement dans ou sous le coffre ne doivent pas être gênés ni endommagés par les vis ou l'appareil lui-même.
- S'assurer d'utiliser uniquement le materiel de montage fourni pour une installation correcte et sûre.

Zur besonderen Beachtung

- Bei der Wahl des Einbauortes ist folgendes zu beachten:
  - Der Tank darf durch die Blechschrauben nicht beschädigt werden.
  - Unter der Fläche, auf die das Gerät montiert werden soll, dürfen sich keine Drähte oder Rohrleitungen befinden.
  - Ersatzreifen, Werkzeug usw. dürfen durch die Blechschrauben nicht beschadigt werden. Achten Sie auch darauf, daß die Herausnahme des Ersatzreifens, Werkzeugs usw. nicht durch das Gerät behindert wird.
- Für sicheren und stabilen Einbau verwenden Sie ausschließlich die mitgelieferten Befestigungsteile.

Precauciones

- Elija cuidadosamente el lugar de montaje, teniendo en cuenta lo siguiente:
  - El depósito de combustible no deberá dañarse con los tornillos roscachapa.
  - No deberá haber mazos de conductores ni tubos debajo del lugar donde vaya a instalar la unidad.
  - La rueda de repuesto, las herramientas, u otros equipos situados dentro o debajo del portaequipajes no deberán verse interferidos ni dañados por los tornillos ni por la propia unidad.
- Para realizar una instalación segura, emplee solamente la ferretería de montaje suministrada.

使用前须知事项

- 安装以前请参照如下列事项，仔细选择安装位置：
  - 不可让自攻螺钉伤及油箱
  - 唱机不可安装在电线配线或暖气管上面。
  - 唱机安装位置或螺钉等不可妨碍或触及备用轮胎，汽车修理工具或其他汽车零件。
- 为保安全生installed，安装时请使用附属的安装用道具。

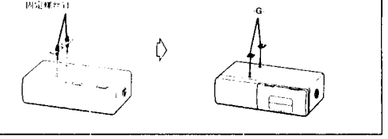
Before Installation
Remove the transit locks (screws) and put the supplied stickers (G) over the holes.

Avant l'installation
Retirer les vis de blocage pour le transport et placer les autocollants fournis (G) sur les orifices.

Vor dem Einbau
Nehmen Sie die Verriegelungsschrauben heraus und setzen Sie die mitgelieferten Plättchen (G) auf die Öffnungen.

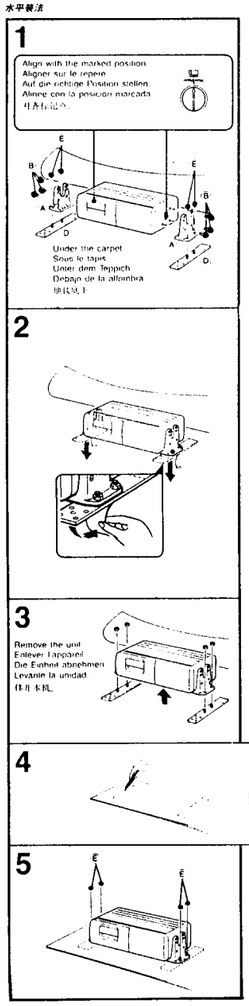
Antes de la instalación
Extraiga los seguros (tornillos) de transporte y coloque las pegatinas suministradas (G) sobre los orificios.

安装以前
取下锁紧用的固定螺钉孔，并贴附随机附上的（G）贴纸于孔上。

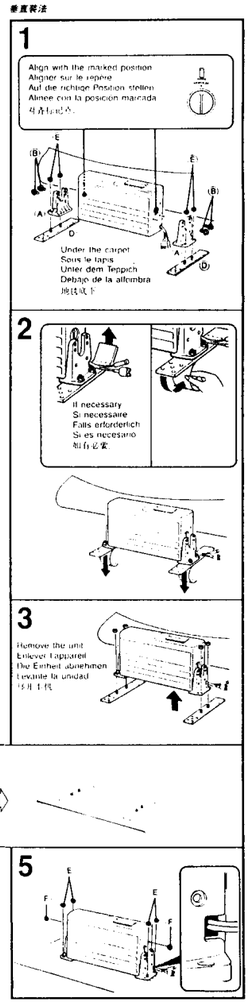


How to Install the Unit
Installation de l'appareil
Installation des Gerätes
Instalación de la unidad
如何安装

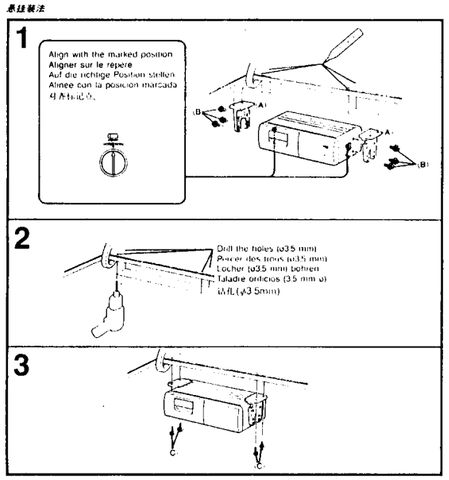
Horizontal installation
Installation de l'appareil à l'horizontale
Horizontaler Einbau
Instalación horizontal
水平装法



Vertical installation
Installation verticale
Vertikaler Einbau
Instalación vertical
垂直装法



Suspended installation
Installation suspendue
Hängender Einbau
Instalación suspendida
悬挂装法



When the unit is to be installed under the rear tray etc. in the trunk room, make sure that the following provisions are made:
- Choose the mounting location carefully so that the unit can be installed horizontally.
- Make sure that the unit does not hinder the movement of torsion bar spring etc. of the trunk lid.

Si l'appareil doit être installé sous le plateau arrière dans le coffre, par exemple, prenez d'abord les précautions suivantes:
- Bien choisir l'emplacement pour pouvoir installer l'appareil à l'horizontale.
- Veiller que l'appareil ne gêne pas le mouvement du ressort du capot, entre autres.

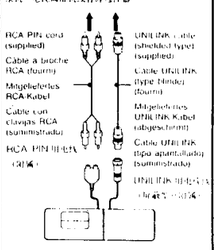
Bei der hangenden Montage unter der Heckablage oder im Kofferraum beachten Sie folgende Vorsichtsmaßnahmen:
- Wahlen Sie den Befestigungsort sorgfaltig so aus, daß die Einheit horizontal montiert werden kann.
- Achten Sie darauf, daß die Einheit die Federn, den Arm usw. des Kofferraumdeckels nicht behindert.

Cuando desee instalar la unidad debajo de la bandeja trasera, etc., en el portaequipajes, tenga en cuenta lo siguiente:
- Elija cuidadosamente el lugar de montaje de forma que la unidad pueda instalarse horizontalmente.
- Cerciórese de que la unidad no impida el movimiento del resorte de la barra de torsión, etc., de la tapa del portaequipajes.

若需把本机安装在车后台等箱的底支架上等处的话，请注意下列事项：
- 安装时请使本机保持水平状态。
- 千万让本机妨碍了行李箱盖的扭转弹簧。

Connections
Connexions
Anschluß
Conexiones
电线之连接

to a Sony UNILINK compatible car stereo
vers la chaîne audio de la voiture compatible Sony UNILINK
an ein Sony UNILINK kompatible Auto Stereogerats
a un sistema estereo del automóvil compatible con UNILINK Sony



Caution
Before making connections, disconnect the ground wire terminal of the car battery to avoid short circuits.

Note
Be sure to use the **supplied** extension cord. Using a cord other than supplied one may cause noise. For details, refer to the installation/connection manual of each product.

Attention
Avant d'effectuer les connexions, débranchez la borne de masse de la batterie de voiture pour éviter un court-circuit.

Remarque
S'assurer d'utiliser le cordon de rallongement **fourni**. D'autres cordons risquent de causer des parasites. Pour plus de détails, se reporter au mode d'emploi pour l'installation/connexion de chaque produit.

Achtung
Zur Vermeidung von Kurzschlüssen trennen Sie vor dem Anschließen den Erdungsdraht vom der Autobatterie ab.

Hinweis
Achten Sie darauf, stets das **mitgelieferte** Verlängerungskabel zu verwenden. Bei Verwendung eines anderen Kabels können Störgeräusche auftreten.
Einzelheiten entnehmen Sie der Installations-/Anschluß-Anleitung des betreffenden Geräts.

Precaución
Antes de realizar las conexiones, desconecte el terminal del conductor de puesta a tierra de la batería del automóvil para evitar cortocircuitos.

Nota
Asegúrese de utilizar el cable de extensión **suministrado**. Si usa otro cable que no sea el suministrado, puede producirse ruido.
Con respecto a los detalles, consulte el manual de instalación de cada producto.

注意

在接以前请先拆下汽车电瓶的接地线，以免发生短路。

注

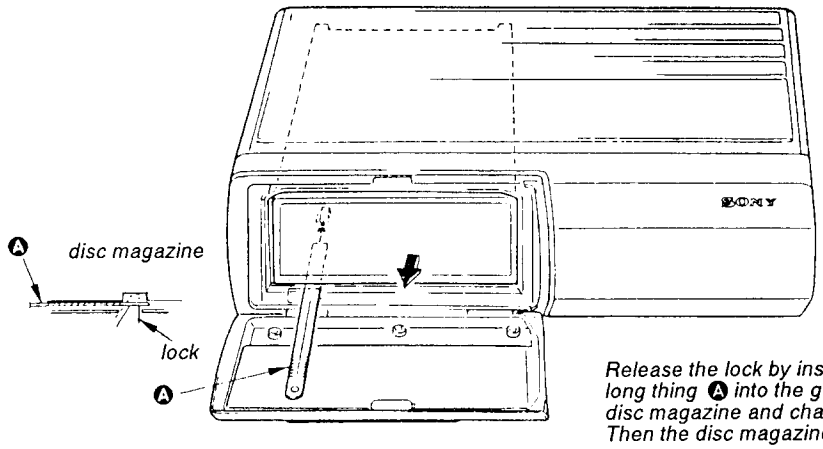
务必使用附属的延长用电线。若使用其它电线会引起噪音。

详细请参看各个机器的安装/连接使用说明书。

SECTION 2
DISASSEMBLY

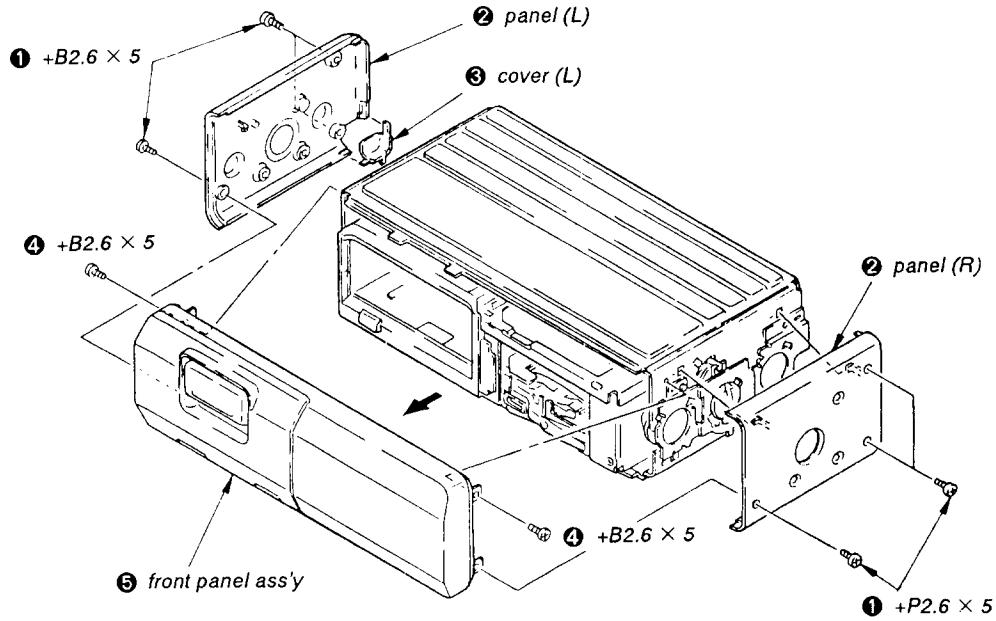
Note: Follow the disassembly procedure in the numerical order given.

DISC MAGAZINE GETTING OUT PROCEDURE ON THE POWER SUPPLY IS OFF

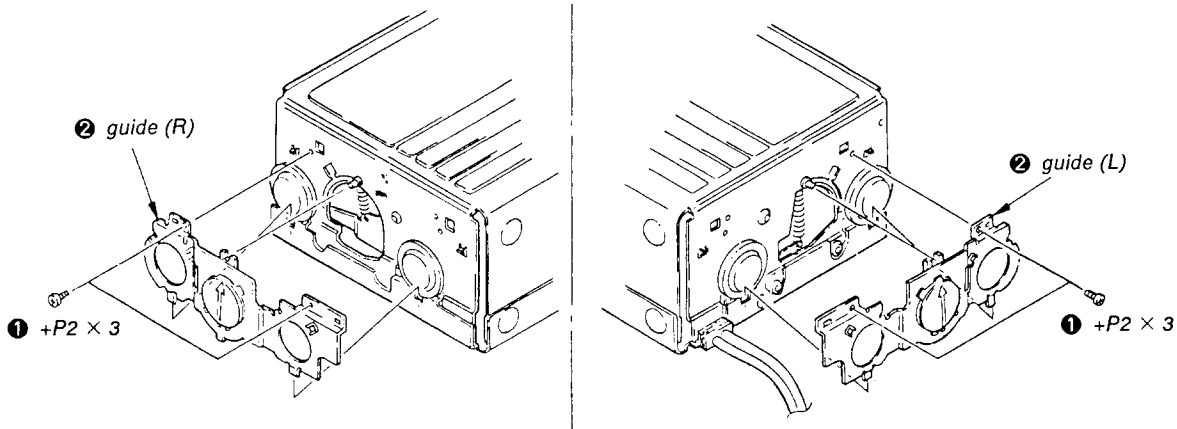


Release the lock by inserting a thin and long thing A into the gap between the disc magazine and chassis as shown in the figure. Then the disc magazine is ejected.

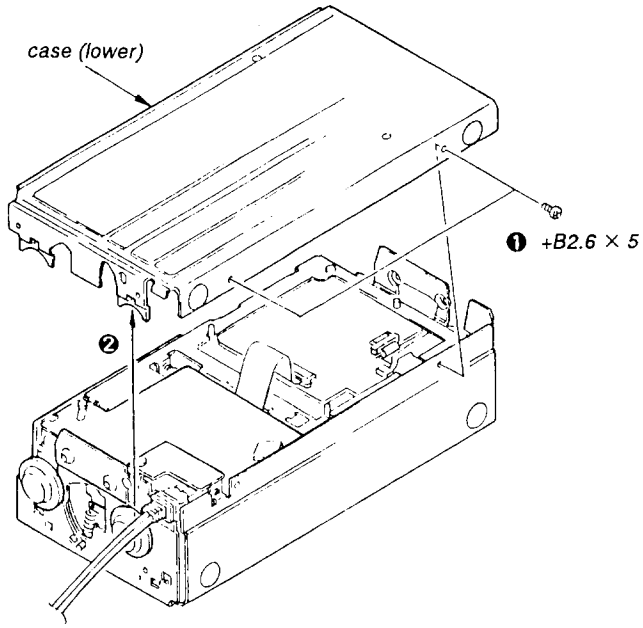
FRONT PANEL ASS'Y AND PANELS (R) AND (L)



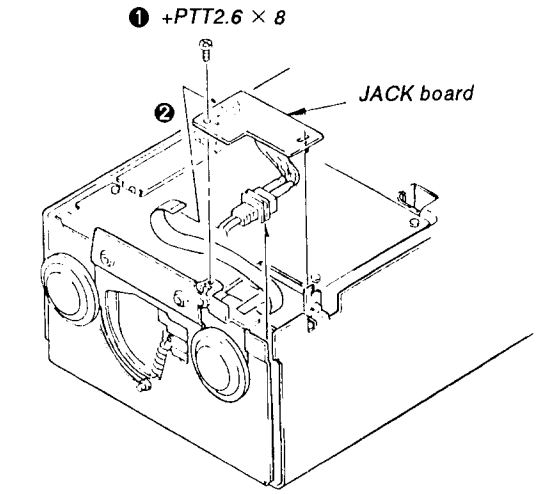
GUIDES (R) AND (L)



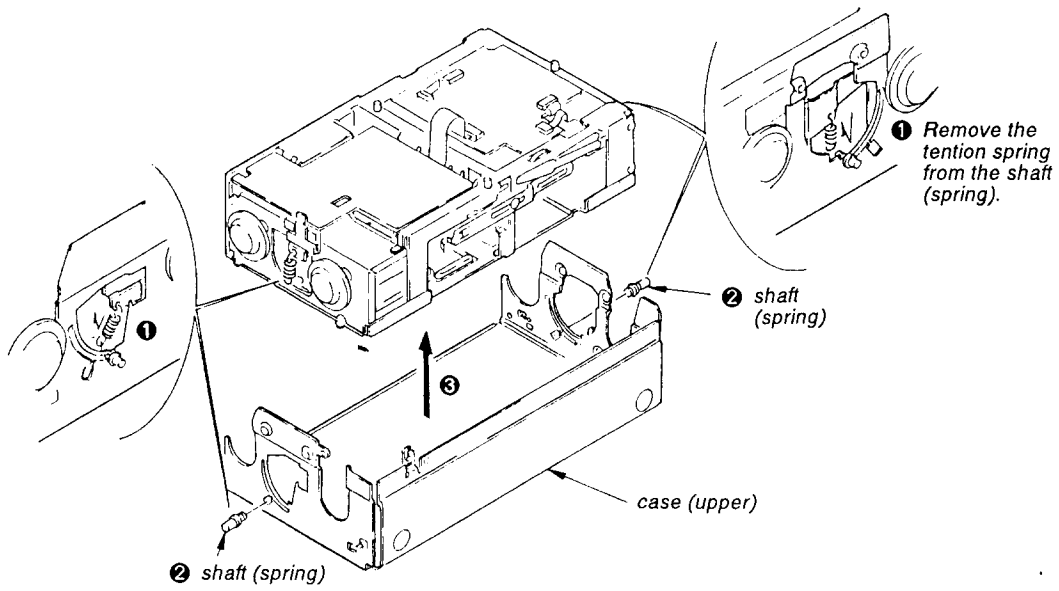
CASE (LOWER)



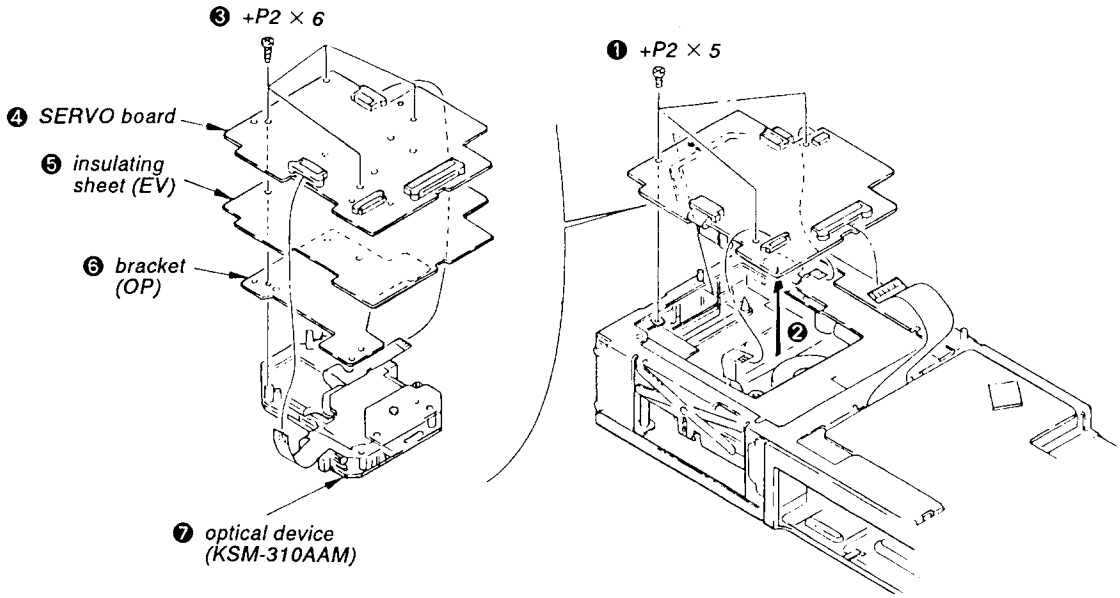
JACK BOARD



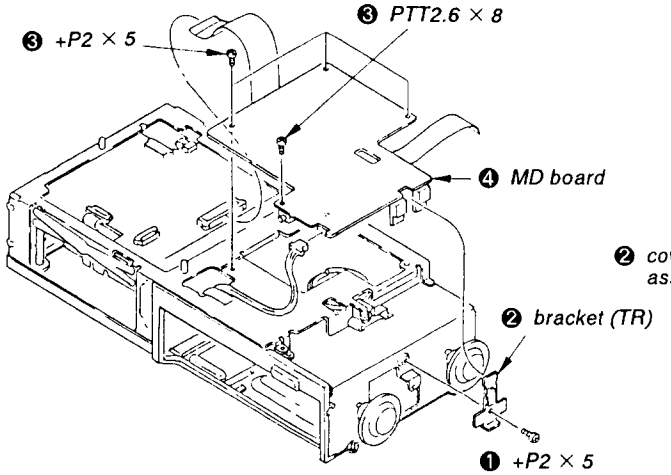
CASE (UPPER)



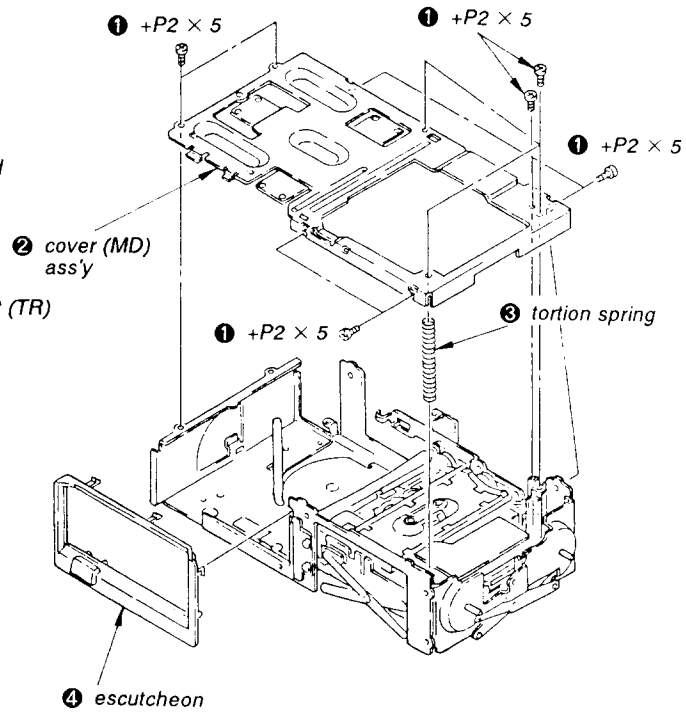
SERVO BOARD AND OPTICAL DEVICE (KSM-310AAM)



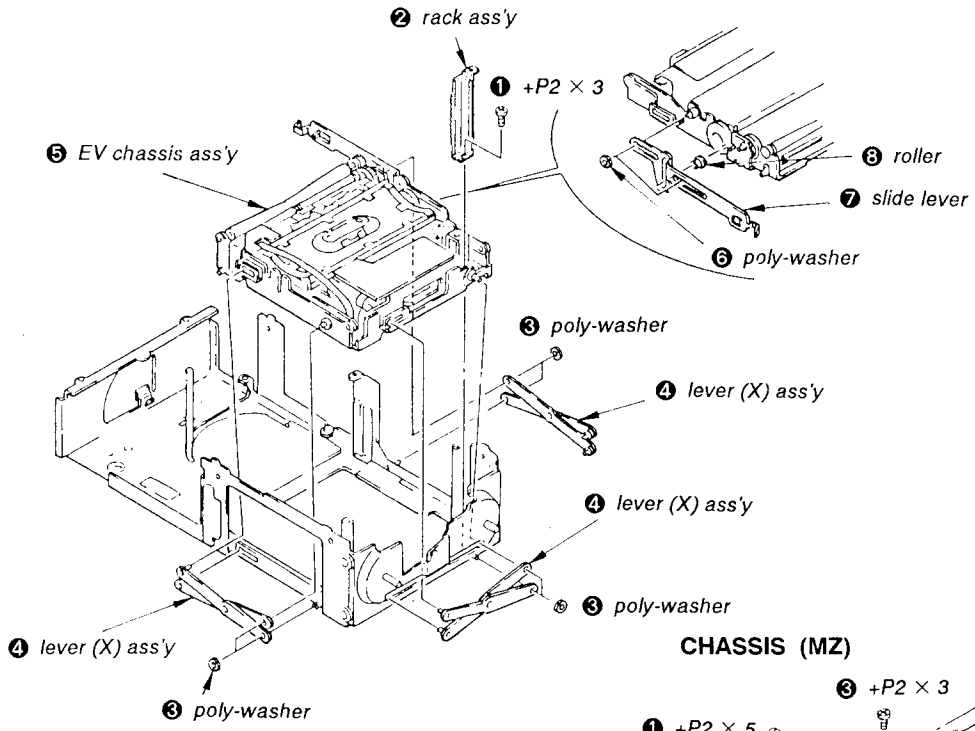
MD BOARD



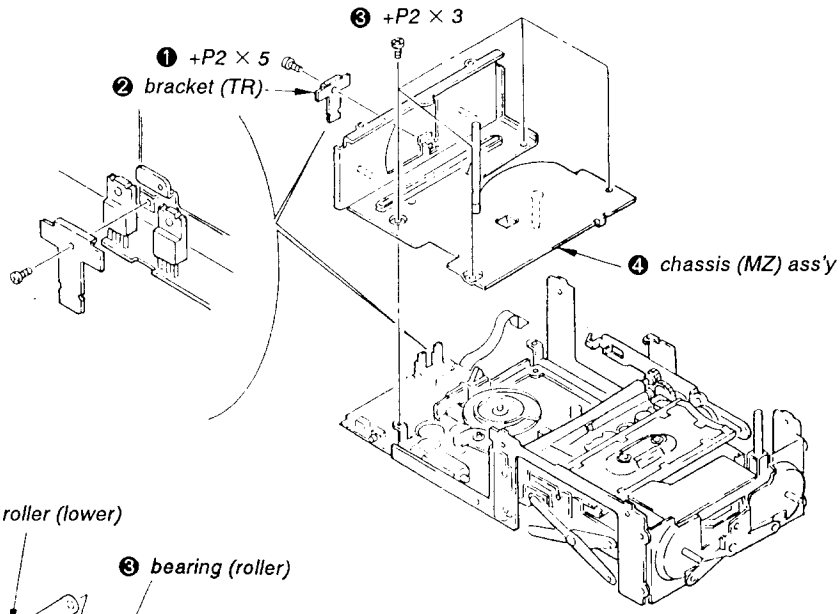
COVER (MD) ASS'Y AND ESCUTCHEON



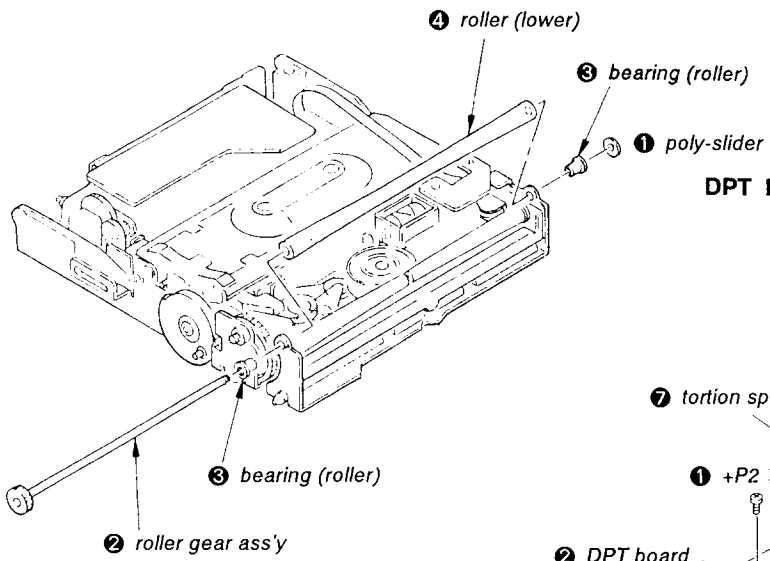
EV CHASSIS ASS'Y



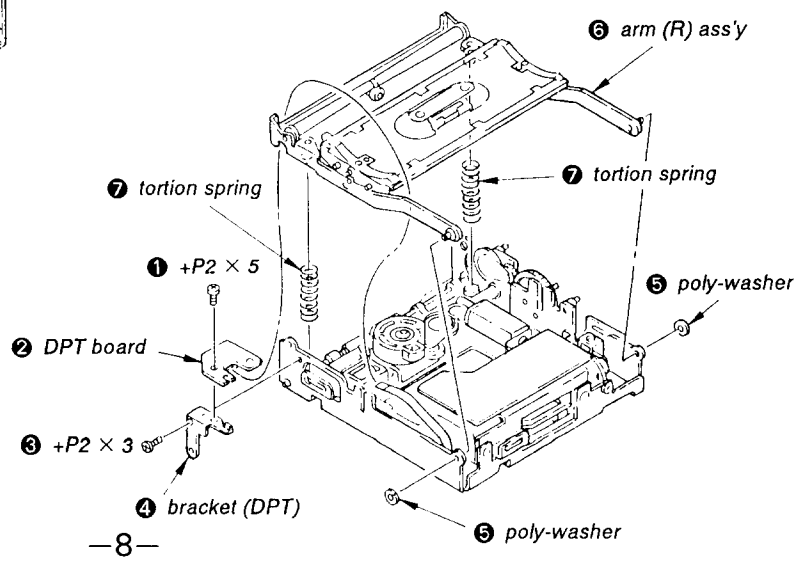
CHASSIS (MZ)



ROLLER (LOWER)



DPT BOARD AND ARM (R) ASS'Y



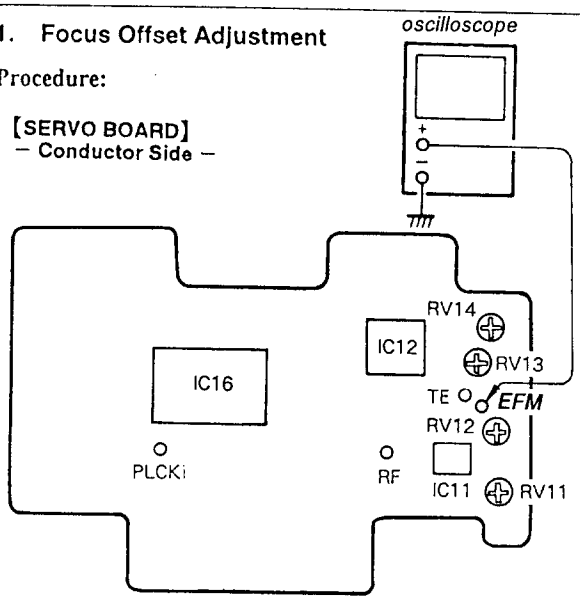
SECTION 3
ELECTRICAL ADJUSTMENTS

1. Perform adjustments as given.
2. Be sure to use the disc "YEDS-18" parts code: 3-702-101-01, but only when indicated.
3. Power supply voltage: DC14.4 V (more than 10A).

1. Focus Offset Adjustment

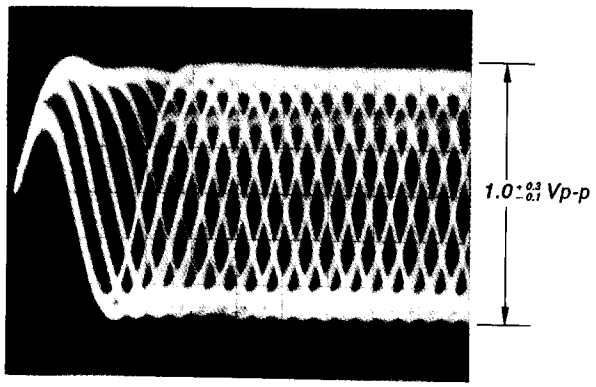
Procedure:

[SERVO BOARD]
– Conductor Side –



1. Connect the oscilloscope to SERVO board test point EFM.
2. Put the set into play mode by loading the disc.
3. Adjust (SERVO board) RV12 so that the oscilloscope. Waveform eye pattern is good.
   (A good eye pattern means that the diamond shape (◇) in the center of the oscilloscope can be clearly distinguished.)

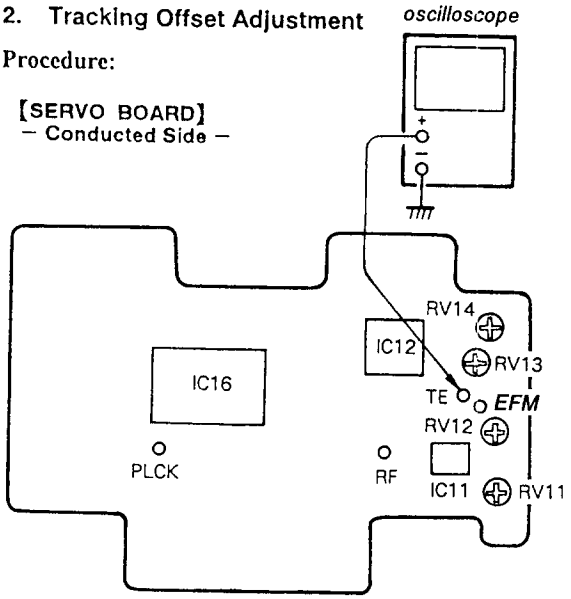
Volt/Div: 200 mV
Time/Div: 0.5 µSec



2. Tracking Offset Adjustment

Procedure:

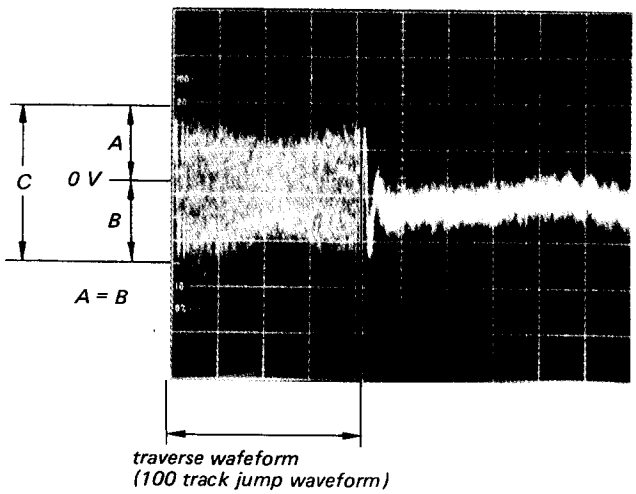
[SERVO BOARD]
– Conducted Side –



1. Connect the oscilloscope to SERVO board test point TE, pin ① of IC11.
2. Put the set into play mode by loading the disc.
3. Press the ⏮ AMS ⏭ button, then, check the traverse waveform*.
4. Adjust RV11 (SERVO board) so that oscilloscope reading is symmetrical in relation to 0 V.

   *Traverse waveform: This is the tracking error waveform appears when crossing the track.

Volt/Div: 0.5 V
Time Div: 2 mSec
Center 0 V



traverse wafeform
(100 track jump waveform)

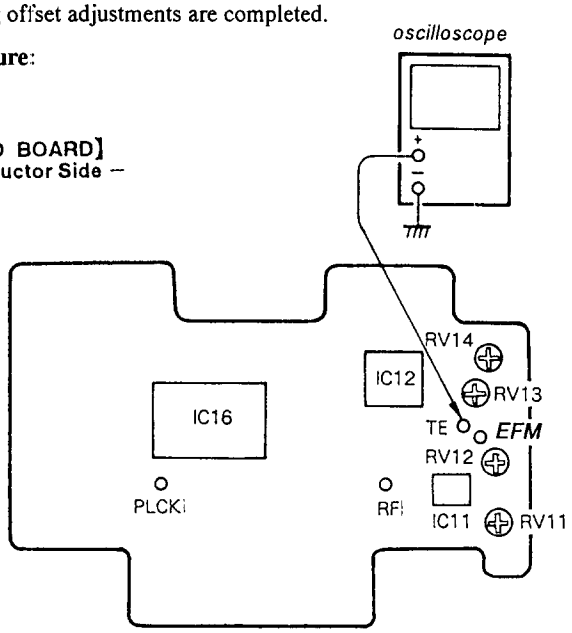
3. Tracking Gain Adjustment (coarse adjustment)

This adjustment is to be performed when replacing the following parts.

- Optical Pick-up Block
- RV13

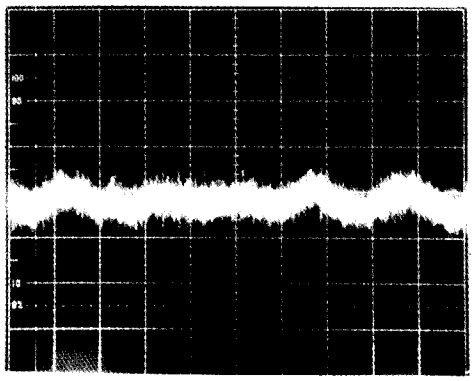
This adjustment should be performed after focus offset and tracking offset adjustments are completed.

Procedure:

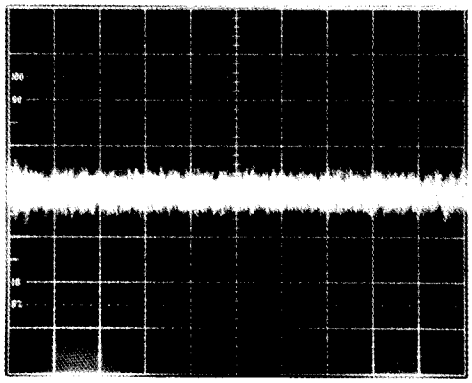


1. Connect the oscilloscope to SERVO board test point TE.
2. Put the set into play mode by loading the disc.
3. Turn SERVO board RV13 from clockwise stop, then check the oscilloscope waveform.
   Fix RV13 at the position where the wavwaveform disappears.

Volt/Div: 0.5 V
Time/Div: 2 mSec



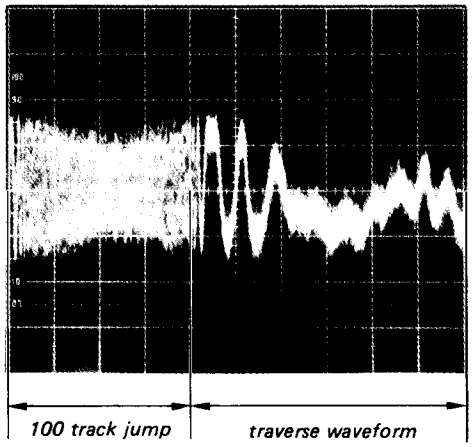
waveform when the wave appears



waveform when the wave disappeared

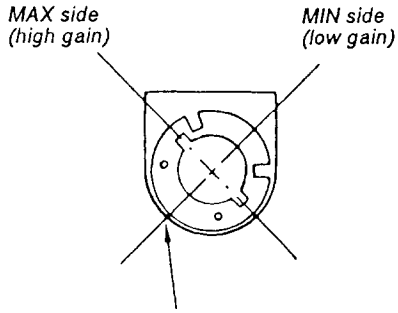
- **When gain lowered...**

When selecting by pressing ⏮ AMS ⏭ button, brake application is poor because of low tracking gain. Threfore, the traverse waveform appears after the 100 track jump waveform, then the selection will be located slowly.



- **When gain is highered...**

Operation noise is heard due to a scratch or dust, then operation will be instability.



RV13 standard position

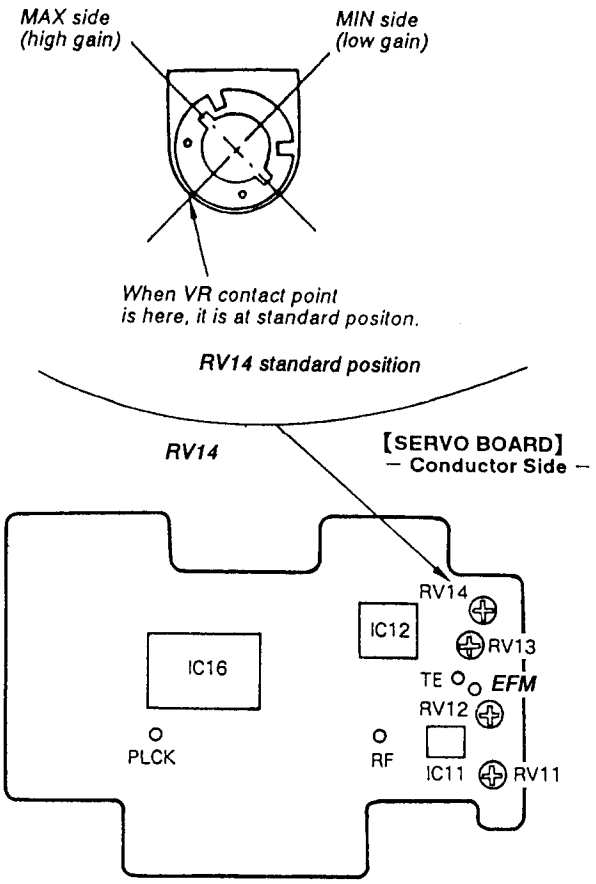
4. Focus Gain Adjustment (coarse adjustment)

This adjustment is to be performed when replacing the following parts.

- Optical Pick-up Block
- RV14

Procedure:

1. Set RV14 (SERVO board) to the standard position.
2. Check that there is not an abnormal amount of operation noise (white noise) from the 2-axis devise. If there is, turn RV14 slightly clockwise.



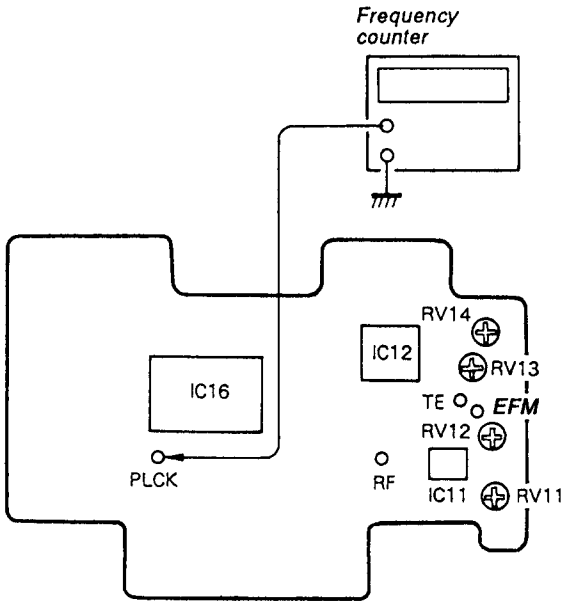
- **When gain is highered...**
  The set does not play because of no focus operation.
- **When gain is highered...**
  Operation noise is heard due to a scratch or a dust, then operation will be unstable.

5. PLL Freerun Frequency Check

Procedure:

1. Connect frequency counter to Pin ㊶ of IC16 (Test point PLCK).
2. Confirm the frequency is 4.3218 MHz ± 20 kHz.

【SERVO BOARD】 – Conductor Side –



SECTION 4
DIAGRAMS

4-1. IC601 SYSTEM CONTROL MICROCOMPUTER (μPD75516G) PORT FUNCTION DESCRIPTION

Pin No.	Port Name	I/O	Port Function
1	APC	O	Laser ON/OFF L: Laser ON
2	CD RESET	O	Reset for Servo System L: Reset
3	CD ON	O	Power ON/OFF for Servo System H: ON
4	–	–	
5	–	–	
6	–	–	
7	RESET	I	Reset for IC601 L: Reset
8	OSC	–	4.19 MHz self-excited oscillation
9	OSC	–	
10	PROM DATA	I/O	E²PROM Data, I/O
11	PROM CLOCK	O	Clock on writing to or reading from E²PROM
12	–	O	
13	ROM INIT	I	Reset by setting L, initialize E²PROM
14	–	–	
15	–	–	
16	–	–	
17	–	–	
18	AUDIO MUTE	O	Mute audio output H: Mute
19	ELEVATOR ON	O	Elevator up/down, Power ON/OFF for sensor H: ON
20	M	O	Motor M601 control
21	M	O	
22	PLG	O	H: Apply power voltage to plunger
23	MC	O	M501, M502 motor control
24	MB	O	
25	MA	O	
26	VSS	–	
27	EJ KEY	I	H: EJECT key is pushed
28	PST	I	H: Magazine is locked
29	EHS	I	Detects height of elevator
30	SCOR	I	SCOR of DSP
31	–	I	
32	A/OUT	I	L: There is AUDIO OUT
33	EE PROM	I	L: There is E²PROM
34	D/OUT	I	H: There is not DIGITAL OUT
35	BUSON	I	L: Communicates with controller
36	–	–	
37	–	–	
38	–	–	

Pin No.	Port name	I/O	Port Function
39	LINK OFF	O	Not used on CDX-U500
40	REQ	O	Request serial communication
41	SI	I	Data input of serial communication
42	SO	O	Data output of serial communication
43	SCK	I	Clock for serial communication
44	BACK UP	I	Detects BACK UP H: BACK UP ON
45	EJT	I	EJT sensor input
46	LOT	I	LOT sensor input
47	HOME	I	HOME sensor input L: Location 1
48	TOP	I	TOP sensor input
49	DPT	I	L: During disc is passing
50	DOE	I	L: Disc is upon the pick-up
51	HOT	I	Not used on CDX-U500
52	CES	I	L: Disc chucking is completed
53	SUBQ	I	SUBQ of DSP
54	GFS	I	GFS of DSP
55	FOK	I	FOK of DSP
56	SENSE	I	SENSE of DSP
57	VDD	–	
58	–	–	
59	CD CLOCK	O	Control Servo System
60	CD LATCH	O	
61	CD DATA	O	
62	D MUTE	O	Not used on CDX-U500
63	SQCK	O	SQCK of DSP
64	EMPH	O	H: During the emphasized disc is playing

4-2. IC501 (BA6247N) MOTOR DRIVER IC OPERATION

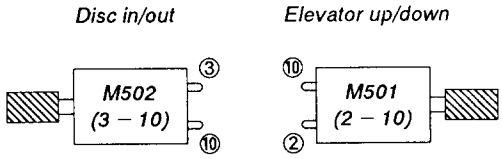
(DRIVER BOARD)

The elevator motor connected between Pin ② and Pin ⑩ of IC501 is as M501, and the disc loading/saving motor connected between Pin ③ and Pin ⑩ of IC501 is as M502.
When the IC port logic is Pin ② > Pin ⑩, Pin ③ > Pin ⑩, the rotating direction of M501 and M502 becomes normal.

ROTATION TRUTH TABLE

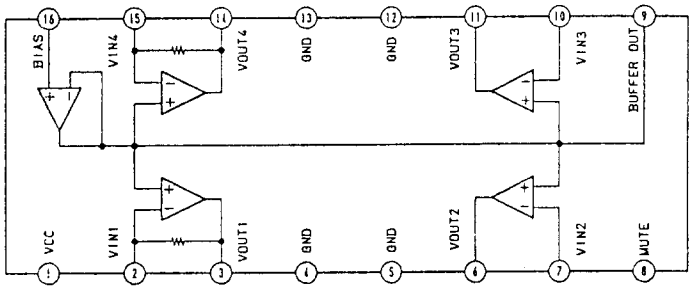
① When MB = MC, both M501 and M502 are stop. (MA value is free.)
② When MB ≠ MC:

MA Pin ⑥	MB Pin ⑤	MC Pin ④	M501	M502	Motor Terminal			Operation
					②	③	⑩	
L	L	H	Reverse	Stop	L	OPEN	H	Elevator UP
H	L	H	Normal	Stop	H	OPEN	L	Elevator DOWN
L	H	L	Stop	Reverse	OPEN	L	H	Disc load
H	H	L	Stop	Normal	OPEN	H	L	Disc save

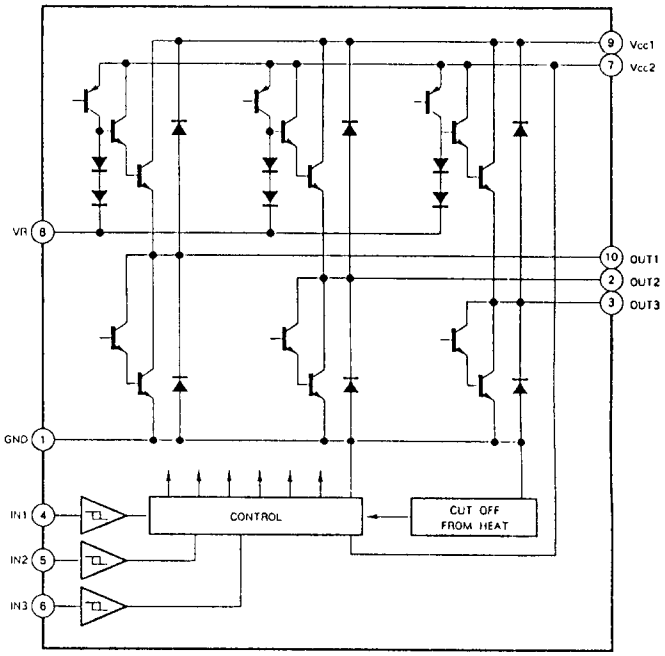


• IC Block Diagrams

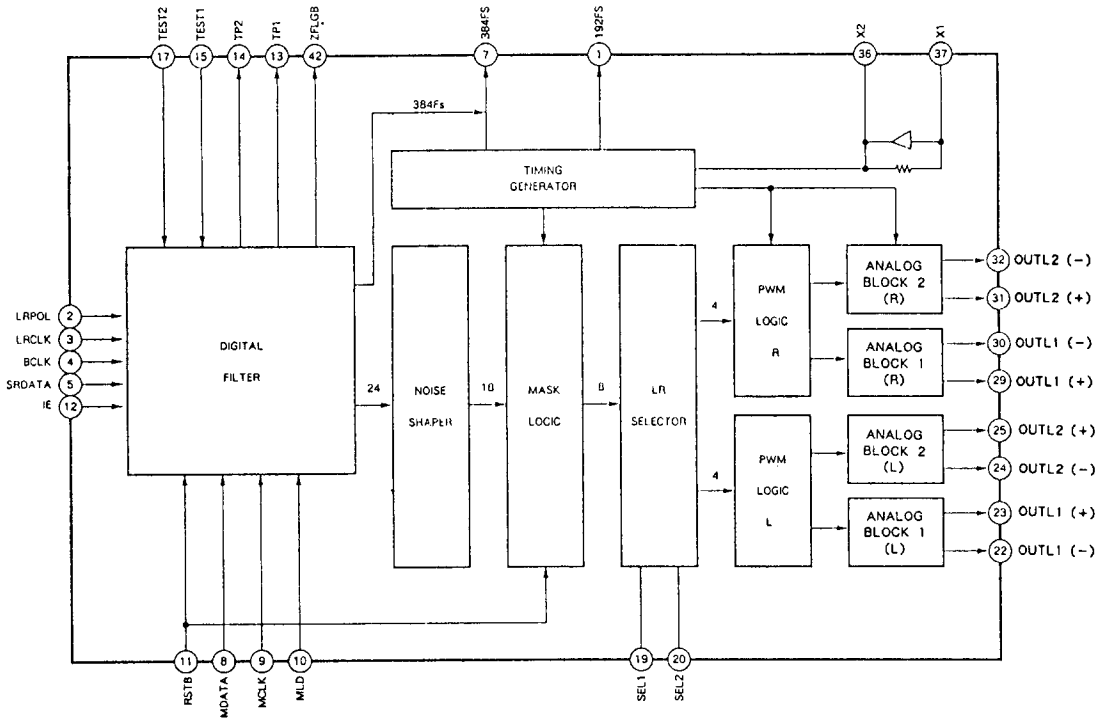
IC13, 14 LA6533



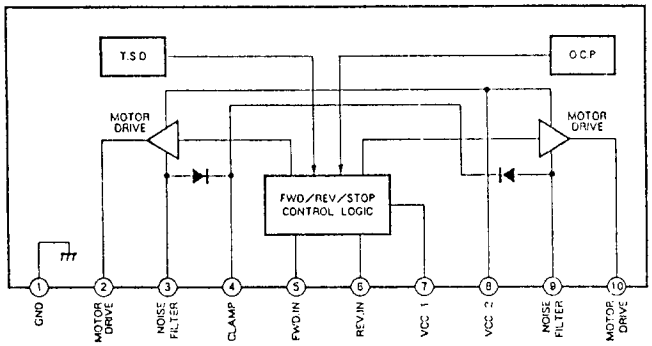
IC501 BA6247N



IC301 MN6472

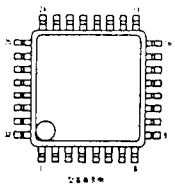


IC602 LB1641

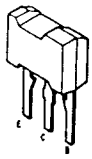


• Semiconductor Lead Layouts

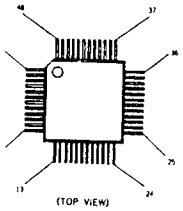
CXA1081Q



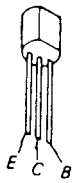
2SA1428-Y



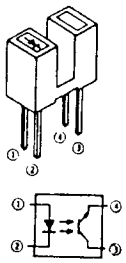
CXA1182Q-Z



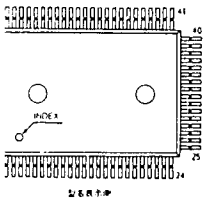
2SC2120-Y



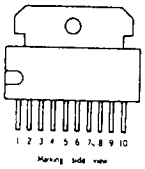
GP1S06



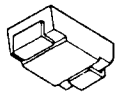
CXD2500Q



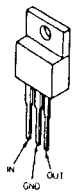
LB1641



LN1251C

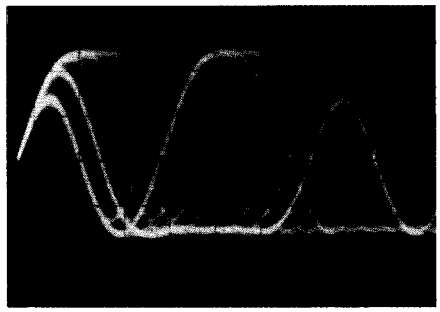


M5F78M12
M5F7810
RC78M05FA

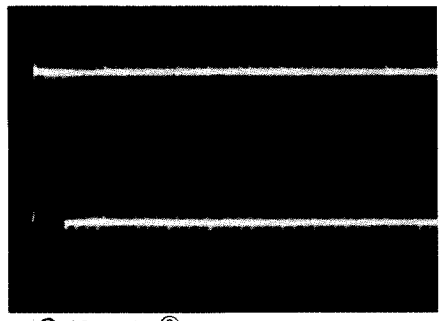


PN147-LF

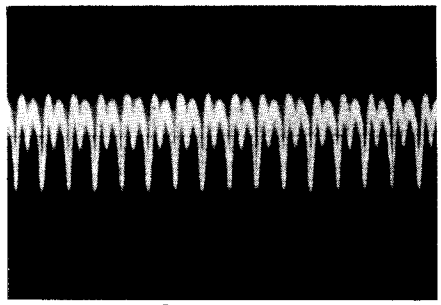
• Waveforms



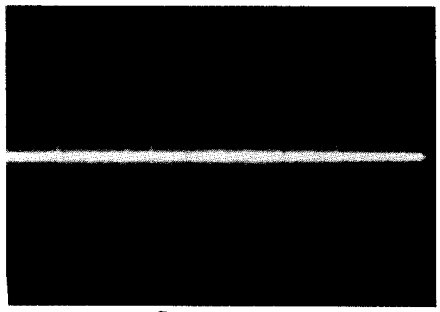
❶ TP
0.2 V/div, 0.5 μsec



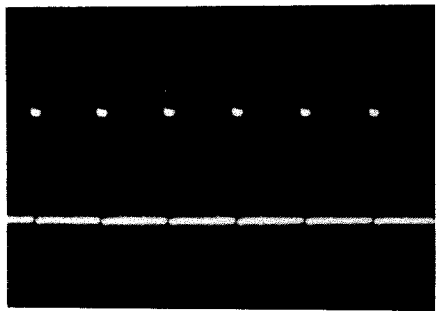
❷ IC11 pin ⑧
1 V, 1 μsec



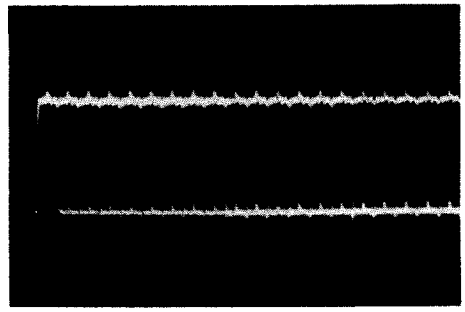
❸ IC12 pin ㉜
0.1 mVp-p, 0.2 μsec



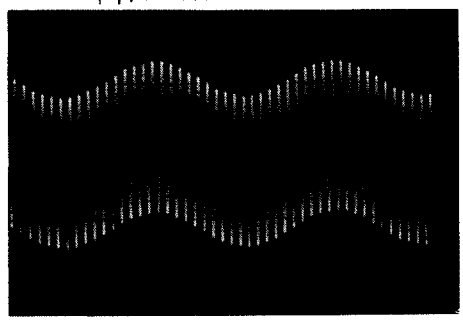
❹ IC16 pin ③
0.5 Vp-p, 50 μsec



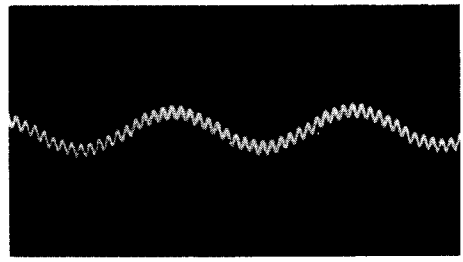
❺ IC16 pin ④
2 Vp-p, 5 μsec



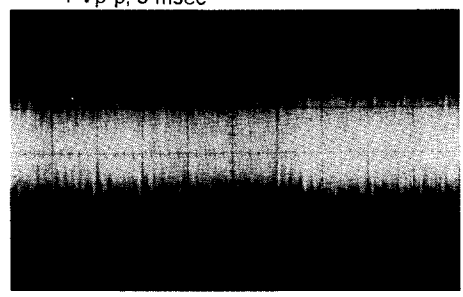
❻ IC301 pin ⑤
2 Vp-p, 1 μsec



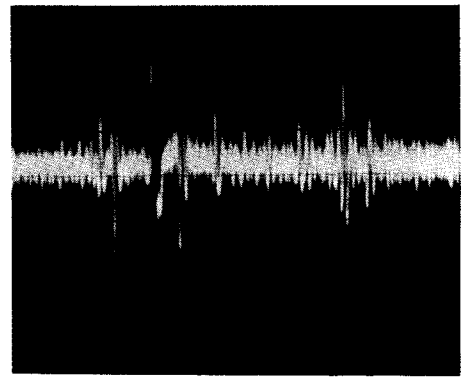
❼ IC202 pin ②
1 Vp-p, 5 msec



❽ IC102 pin ②
1 Vp-p, 5 msec

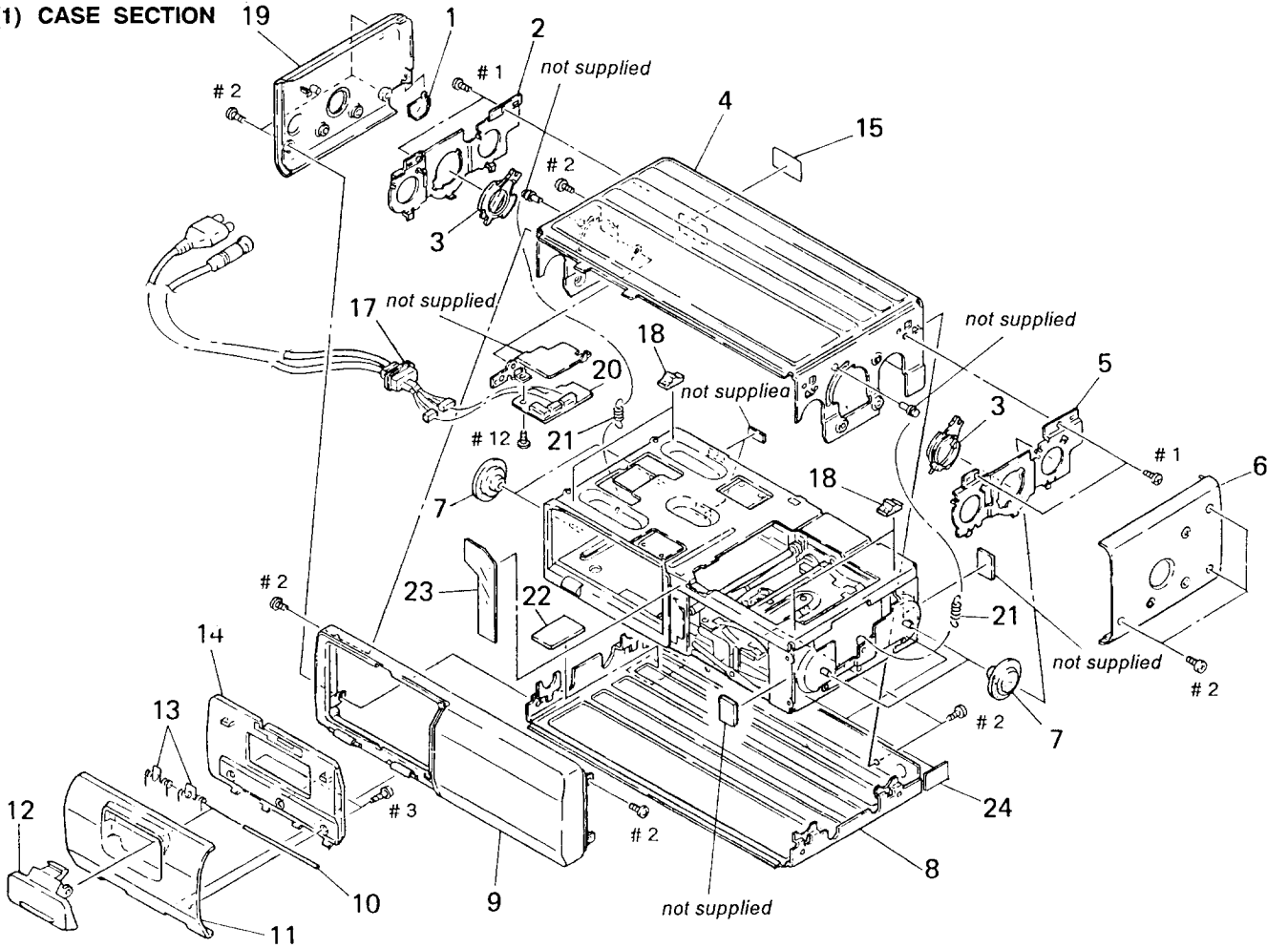


❾ IC11 pin ①
0.2 Vp-p, 5 msec

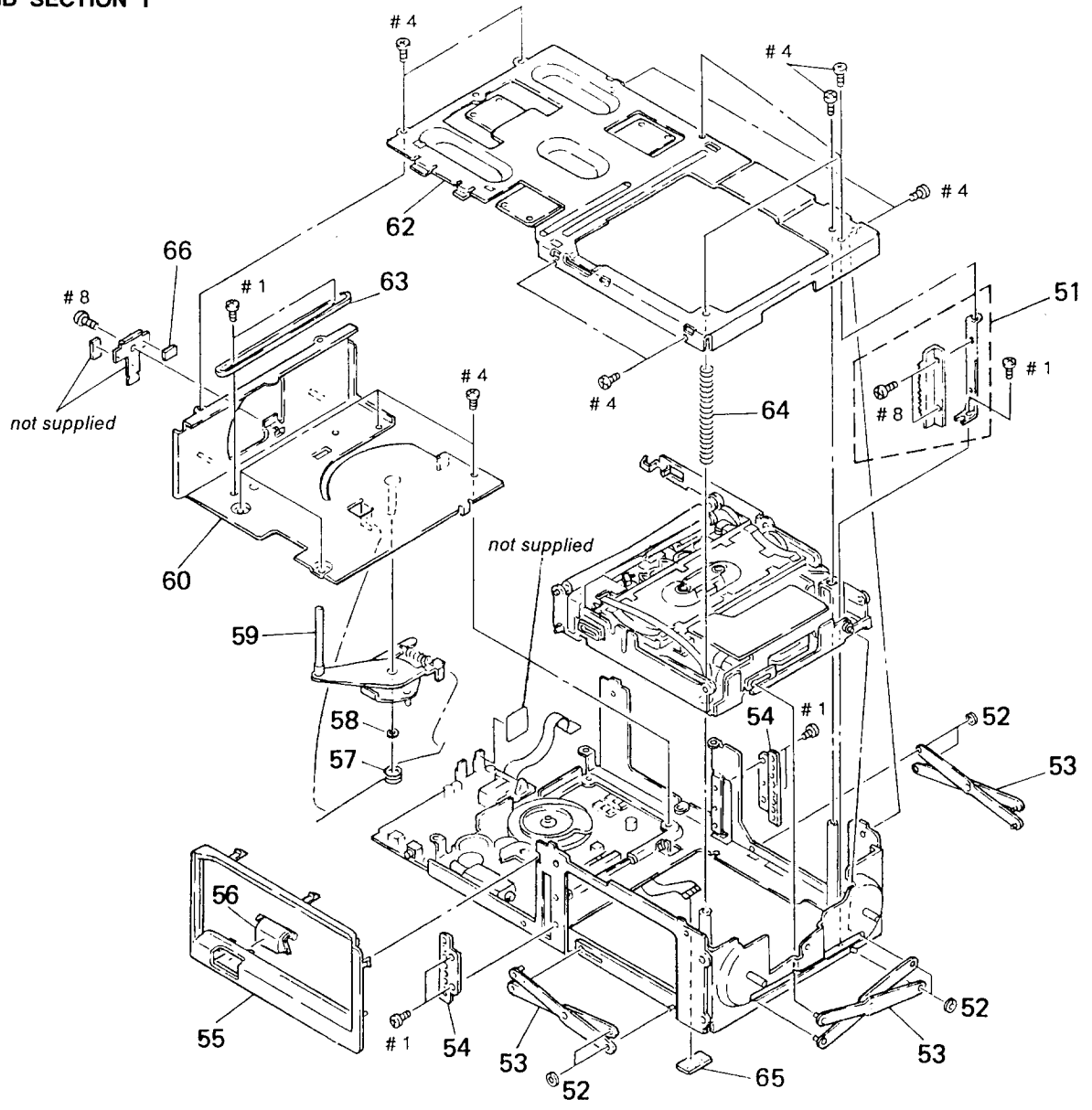


❿ IC11 pin ㉜
0.1 Vp-p, 5 msec

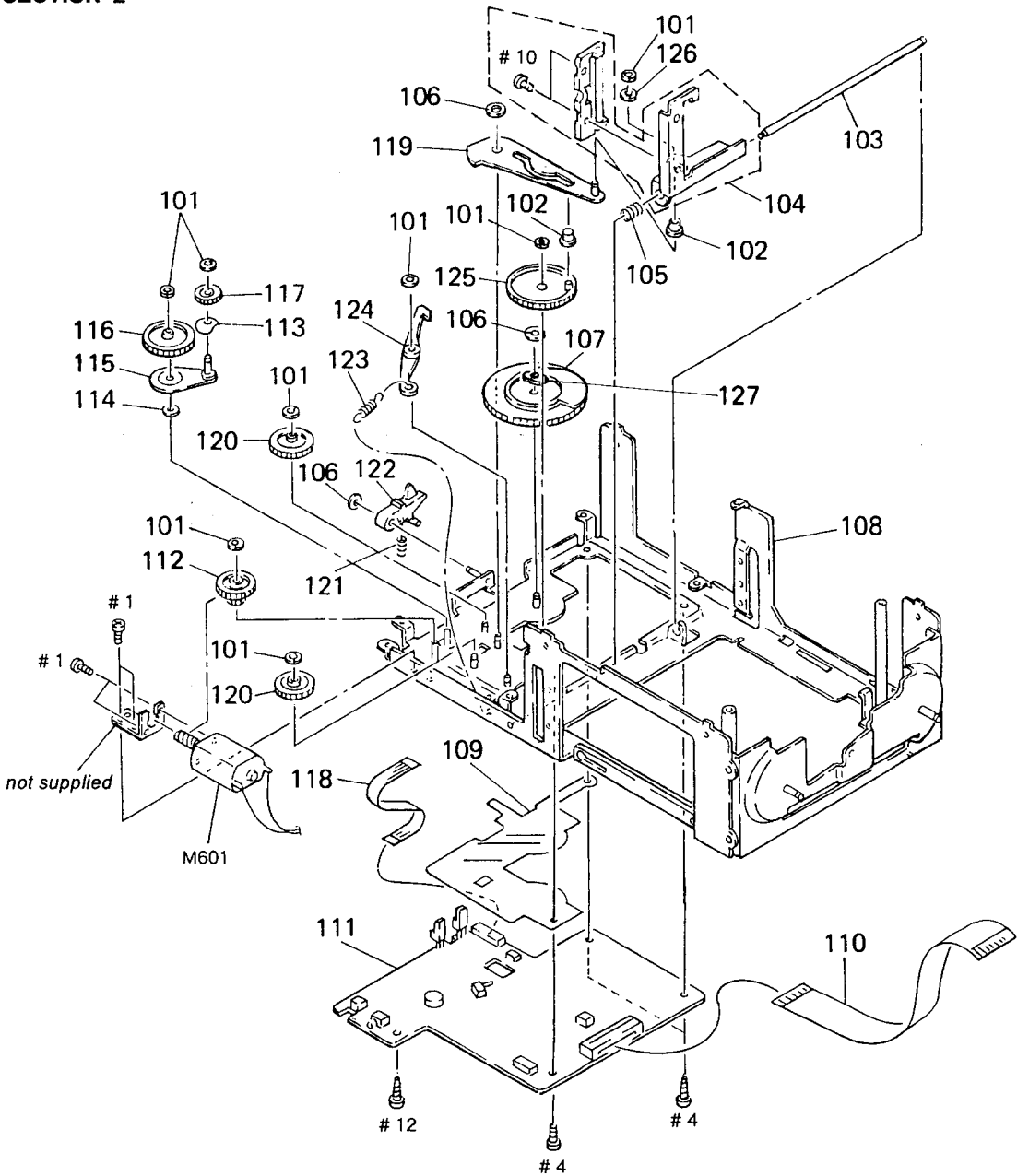
(1) CASE SECTION



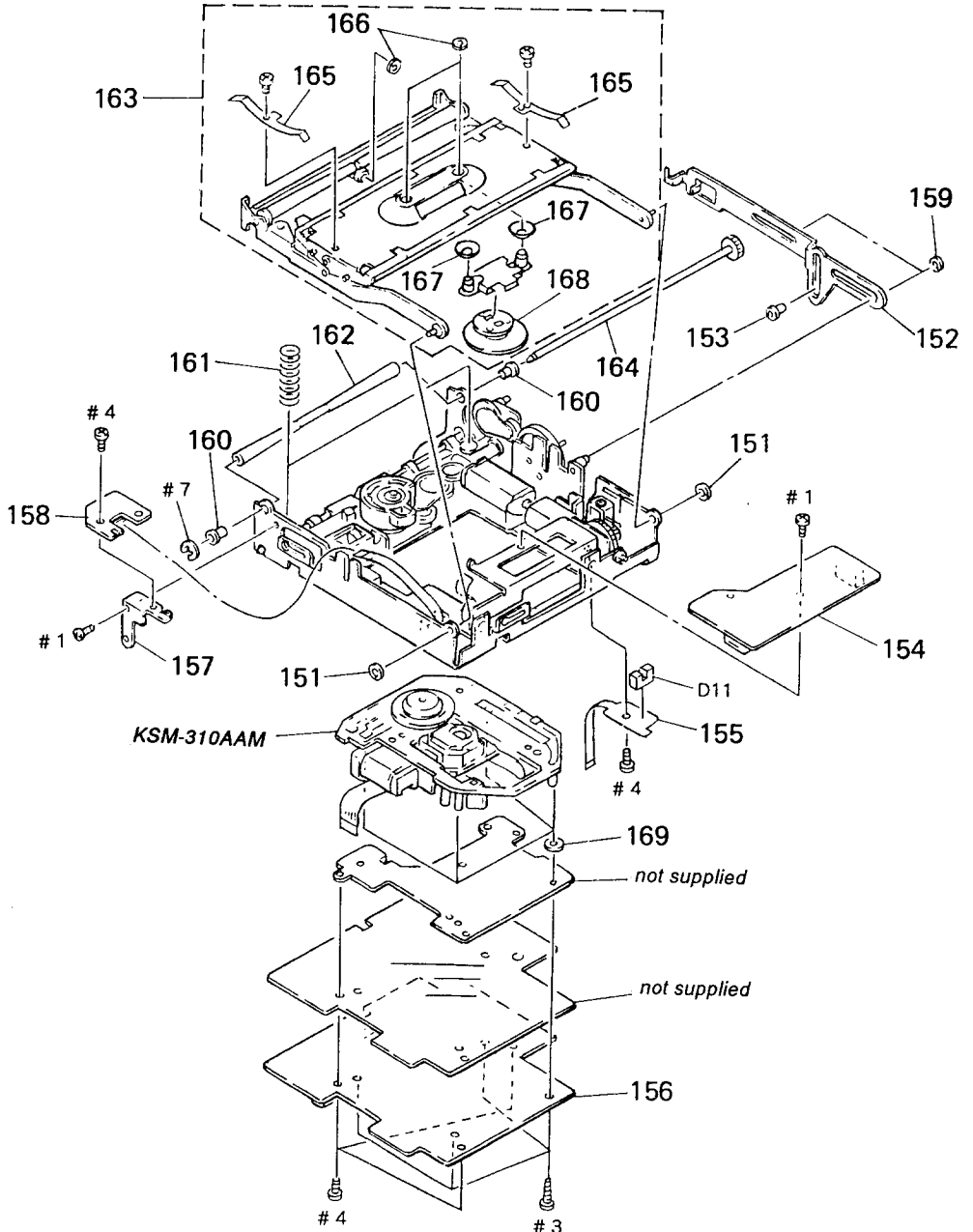
(2) MD SECTION 1



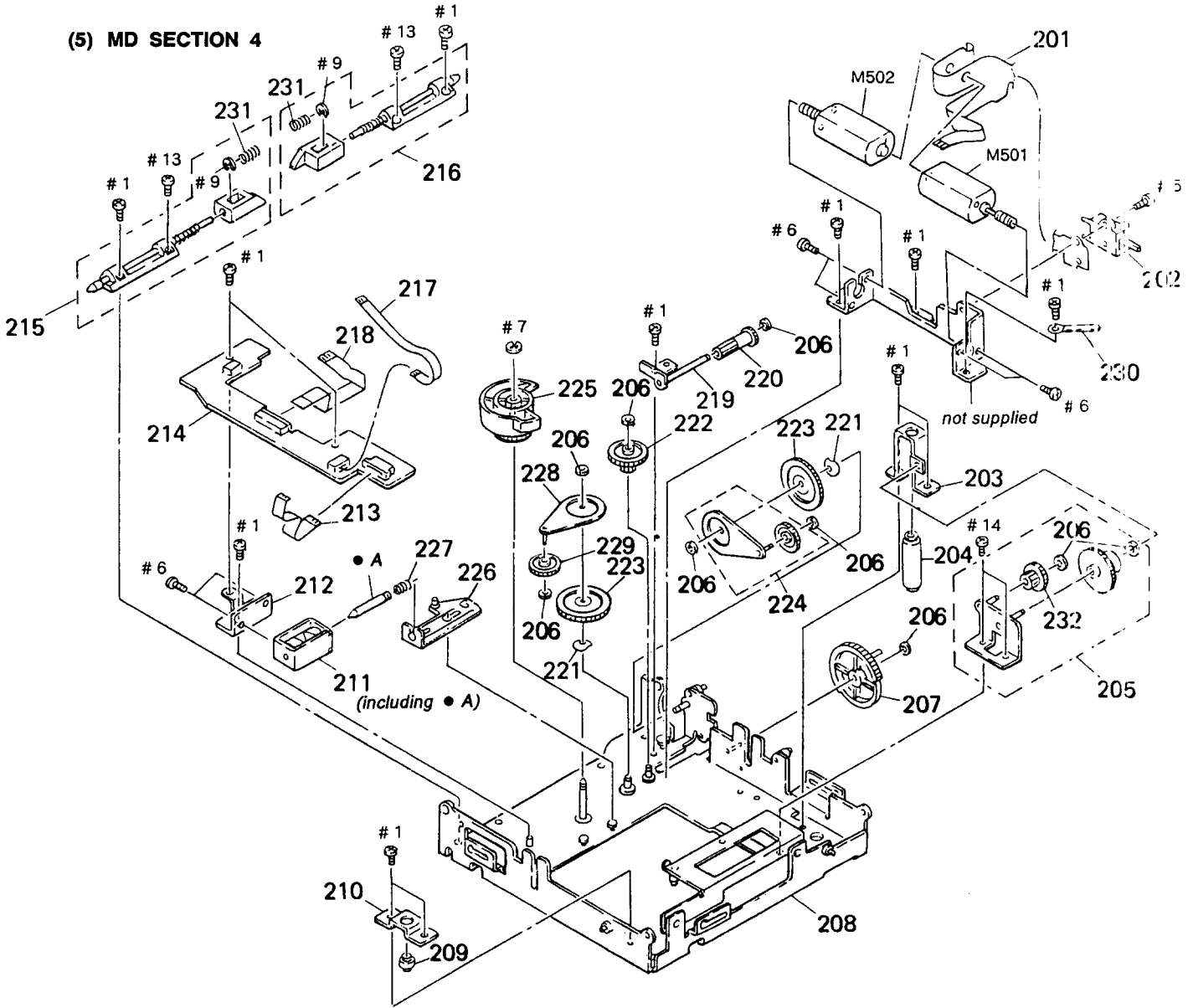
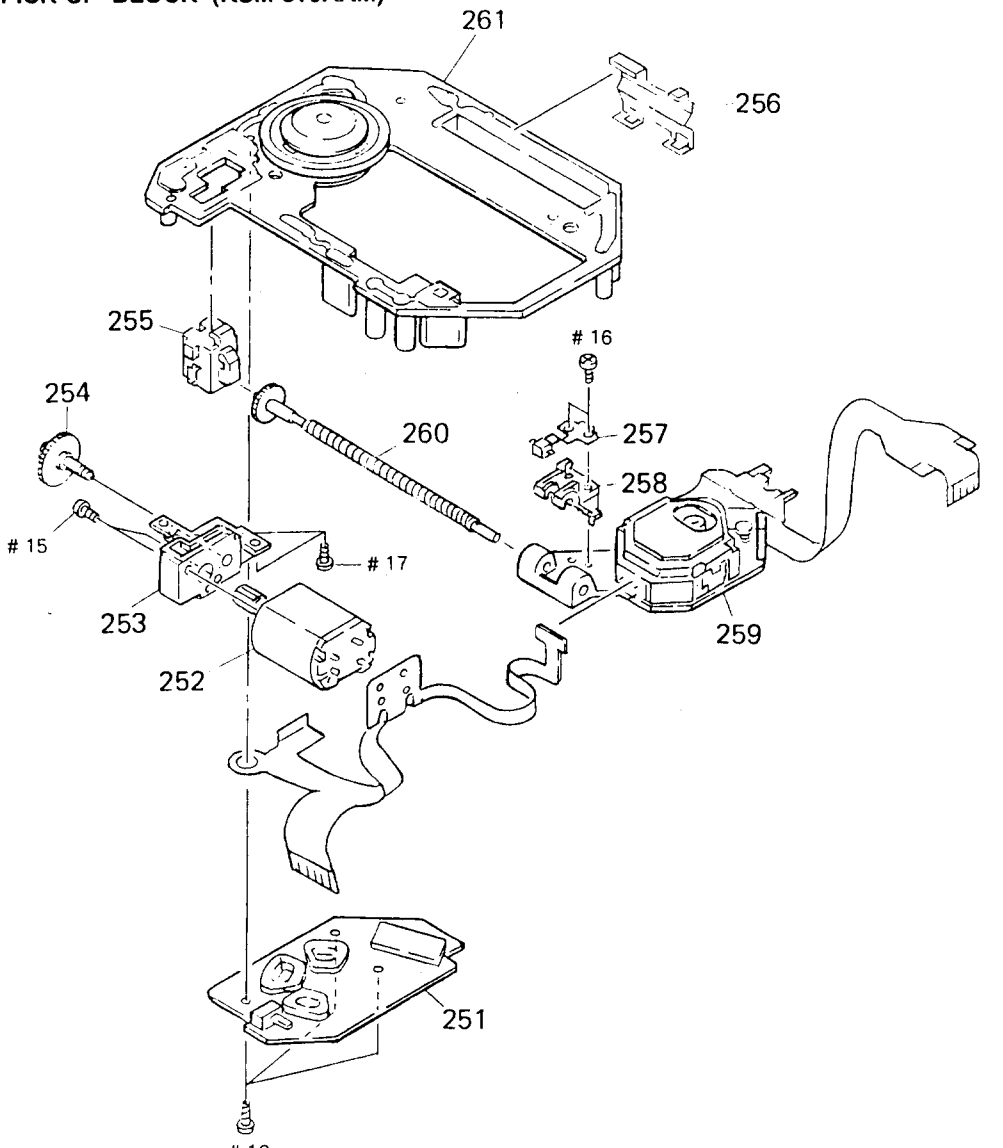
(3) MD SECTION 2



(4) MD SECTION 3



(5) MD SECTION 4



(6) OPTICAL PICK-UP BLOCK (KSM-310AAM)